

FIELD SURVEY FOR ASTRAGALUS PAYSONII (PAYSON'S MILKVETCH)
AND DRABA BOREALIS (BOREAL DRABA),
BRIDGER-TETON NATIONAL FOREST
FINAL REPORT

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Plant EF: *Astragalus paysonii*

ACKNOWLEDGEMENTS

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TABLE OF CONTENTS

	<u>Page</u>
INTRODUCTION	1
METHODS	1
RESULTS	3
SPECIES SUMMARIES	3
<u>Astragalus paysonii</u>	4
<u>Draba borealis</u>	14
SUMMARY AND RECOMMENDATIONS	21
LITERATURE CITED	22

FIGURES, TABLES, AND APPENDICES

	<u>Page</u>
<u>Figures</u>	
Figure 1. Study Area	2
Figure 2. Line drawing of <u>Astragalus paysonii</u>	11
Figure 3. Close-up of fruit of <u>Astragalus paysonii</u>	12
Figure 4. Wyoming distribution map of <u>Astragalus paysonii</u>	13
Figure 5. Line drawing of <u>Draba borealis</u>	18
Figure 6. <u>Draba borealis</u> , Big Sheep Mountain, western Wind River Range, Sublette Co., WY.	19
Figure 7. Wyoming distribution map of <u>Draba borealis</u>	20
<u>Tables</u>	
Table 1. Location and demographic information for known populations of <u>Astragalus paysonii</u> in Bridger-Teton National Forest, Wyoming	9
Table 2. Location and demographic information for known populations of <u>Draba borealis</u> in Bridger-Teton National Forest, Wyoming	17
<u>Appendices</u>	
Appendix A. Element Occurrence Records and location maps for populations of <u>Astragalus paysonii</u> and <u>Draba borealis</u> in Bridger-Teton National Forest	23
Appendix B. Survey routes, 1991-92	101
Appendix C. Standard field form, The Nature Conservancy	114

INTRODUCTION

Astragalus paysonii (Payson's milkvetch) and Draba borealis (boreal draba) are designated as Sensitive plant species for Bridger-Teton National Forest (BTNF) and Region 4 of the US Forest Service (USDA Forest Service 1989). Payson's milkvetch is a regional endemic, known only from northern and east-central Idaho and western Wyoming. Boreal draba is found in eastern Asia, Alaska, and western Canada, with disjunct populations in Park, Teton, Lincoln, and Sublette Counties in western Wyoming.

In 1991, BTNF contracted on a cost-share basis with The Nature Conservancy's Wyoming Natural Diversity Database (WYNDD) to conduct field surveys of Payson's milkvetch and boreal draba on Forest lands. The objectives of this two-year project were to determine the conservation status of each species and to collect information on habitat usage and population size necessary for proper management to ensure longterm viability of the species on Forest lands.

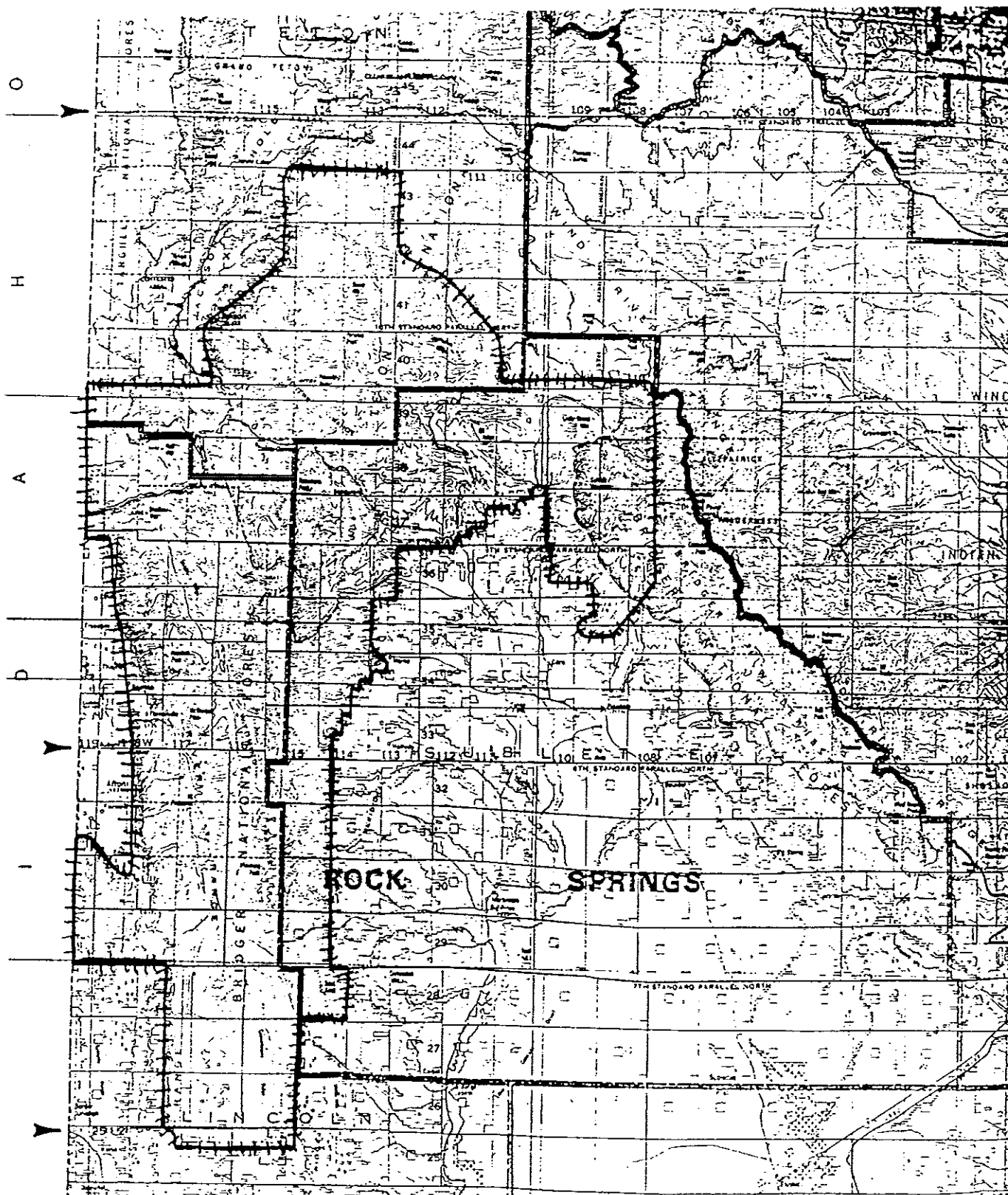
Fieldwork in 1991 focused on populations and potential habitat of Draba borealis in the Gros Ventre and Wind River Ranges (Marriott 1992). During 1992, surveys were undertaken for both species in the Salt River and Wyoming ranges, and additional fieldwork for Draba borealis was conducted in the western Wind River mountains. This report summarizes the results of both seasons of field surveys.

METHODS

Prior to actual field work, information from known populations of Astragalus paysonii and Draba borealis was obtained from secondary sources, including WYNDD files and computer databases, the Rocky Mountain Herbarium (RM), the literature, and knowledgeable individuals. Geologic maps (Love and Christiansen 1985), USGS topographic maps and Forest Service land use maps were consulted to identify potential survey sites (Appendix B). Aerial reconnaissance by small plane was also used to identify areas of potential habitat within the study area.

Field surveys were conducted from July 26- August 8 1991 and July 18- August 9, 1992. Information on biology, habitat, population size, and management needs was collected using the standard field form of The Nature Conservancy (Appendix C). Populations were mapped on 7.5' USGS topographic maps. If populations were sufficiently large, voucher specimens were taken for deposit at the RM. Information gathered in the field was added to the computer databases of the WYNDD.

Figure 1. Study Area



RESULTS

Twenty-four populations of Astragalus paysonii were located on BTNF lands in the Wyoming and Salt River ranges in 1992. Sixteen of these represented new, previously undocumented populations. As a result of 1992 field work, thirty populations of Payson's milkvetch are now known for western Wyoming.

Field work in 1991 and 1992 resulted in the discovery of two new populations of Draba borealis on BTNF lands in the Gros Ventre and Wyoming ranges. Four other known populations were relocated and surveyed. Three previously reported occurrences could not be relocated.

SPECIES SUMMARIES

Information on the biology, habitat requirements, and conservation status of Astragalus paysonii and Draba borealis is presented in the following species summaries. Element occurrence records (formatted database reports) and population maps are contained in Appendix A. A key to fields in these printouts is also included. These printouts contain the most detailed, population-specific information available.

Astragalus paysonii (Rydb.) Barneby
PAYSON'S MILKVETCH
Fabaceae (Leguminosae)

Legal Status: USFWS: Category 3C
USFS Region 4: Sensitive
USFS Region 1: Sensitive

Natural Heritage Rank: Wyoming: List 1; G4/S2
Idaho: G4/S2

Description: (see Figures 2 & 3)

Technical Description: Perennial herb with a taproot or short caudex; stems several to numerous, ascending, 2-4.5 dm tall; herbage pale green and nearly glabrous; stipules free, 2-5 mm long; leaves 4-9 cm long, odd-pinnate; leaflets 7-15, ovate-oblong to obovate-cuneate, 5-20 mm long, bright green above and pale beneath, mostly retuse (with leaf tips shallowly notched at the tip); racemes 5-20 flowered; peduncles 3-8 cm long; flowers white, often purple tinged at base of petals, banner 7-9 mm long; calyx tube 2-3 mm long, pubescent with black-strigillose hairs; fruit pods declining or deflexed, short-stipitate, stipe 1-1.5 mm, concealed by calyx; body crescent-shaped, linear-ellipsoid, 10-17 mm long, 2.5-3.5 mm broad, cuspidate at apex, narrowly grooved dorsally, fully 2-locular, with glabrous or white-puberulent valves that become papery and straw-colored when fully mature (Hitchcock and Cronquist 1961; Barneby 1964; Dorn 1992).

Characters Useful in Field Identification: Payson's milkvetch is an upright, multiple-stemmed perennial herb growing to 5 dm tall. Stem leaves are 4-9 cm long and pinnately compound, with 7-15 oval to wedge-shaped leaflets. The leaflets are darker green above than below, and are slightly notched at the tips. Stipules are free to the base. The small, pea-like flowers are white with a faint tinge of lilac and are borne in numerous axillary racemes of 5-20 flowers. Lorain (1990) has noted a sweet fragrance to the flowers. Fruit pods are narrowly crescent shaped, 10-17 mm long, and glabrous or white-hairy. Each fruit has a distinct groove on the dorsal side and has two separate locules. At maturity, fruits are straw-colored and deflexed. Shade morphs may be more robust and have a mixture of white and dark hairs on the fruits (Lorain 1990; USDA Forest Service 1991; Dorn 1992).

Similar or Related Species: Astragalus alpinus resembles A. paysonii in having pubescent, bilocular fruit and leafy stems, but differs in having black-haired fruit, a more prostrate growth form, and fused stipules (united on the side of the stem opposite the petiole). A. canadensis also has fruit with two locules and a dorsal groove, but can be distinguished by its cream or pale yellow flowers, congested inflorescence, erect fruit, and dolabriform leaf pubescence (with hairs attached at the middle,

rather than at the base as in A. paysonii). A. miser var. hylophilus is usually the most abundant Astragalus species to occur with Payson's milkvetch and can be differentiated by its mostly basal leaves, united stipules and 1-loculed, flattened fruit. In the absence of flowers and fruits, specimens of Hedysarum can strongly resemble A. paysonii in appearance, but differ in having united stipules and conspicuously veiny leaflets (Dorn 1992).

Flowering/Fruiting Season: Flowering occurs from late June to August. Fruit are produced from July to October (USDA Forest Service 1991).

Distribution: Payson's milkvetch is known only from the Clearwater Mountains of north-central Idaho, the Palisades Reservoir area of eastern Idaho, and the Wyoming and Salt River ranges of western Wyoming (USDA Forest Service 1991). In Idaho, Astragalus paysonii has been documented from Nez Perce National Forest (Idaho Co.), Challis National Forest (Custer Co.) and Targhee National Forest (Bonneville Co.), as well as lands managed by the Couer d'Alene District of the BLM and the state (Lorain 1990; unpublished records of the Idaho Conservation Data Center).

All known Wyoming populations occur in Lincoln and Sublette Counties on lands managed by Bridger-Teton National Forest. Thirty populations occur in the Big Piney, Greys River, and Kemmerer Ranger Districts (Figure 4). Locations of these populations are provided in Table 1. More detailed location information and maps for each occurrence of Astragalus paysonii in the BTNF are included in Appendix A.

Recent botanical surveys in the Wyoming portions of Targhee NF and the west slope of the Wind River Range (BTNF) have failed to locate populations of Payson's milkvetch in these areas (Markow 1992; Fertig 1992). Lichvar (1979) also did not report this species in the Gros Ventre mountains. In light of recent discoveries in the northern Wyoming Range, however, this species should be looked for in appropriate habitat in the Gros Ventres.

Habitat: Astragalus paysonii occurs primarily in areas that have been disturbed by natural or human processes. It acts as an early successional species, but is usually not a pioneer of newly disturbed sites. Most populations located in 1992 were found in semi-shady roadcuts or trails with exposed, sandy soil and low cover of grasses and forbs. A similar habitat preference has been noted in northern Idaho (Lorain 1990). Wyoming populations occur at elevations from 6700-9600 feet, in contrast to Idaho sites where it is found between 4600-5800 feet (Lorain 1990). A. paysonii is usually found on south or east-facing slopes or flat surfaces. Common associates include A. miser var. hylophilus, A. agrestis, Lupinus argenteus, Hedysarum occidentale, Trisetum

spicatum, Bromus inermis, Achillea millefolium, and Thalictrum fendleri.

Payson's milkvetch is also present in clear cuts. The age of the clear cut appears to influence population size and density. Plants are most numerous in cuts that are more than 15 years old and which have semi-open canopies with exposed sandy or mineral soils (Shultz and Shultz 1978). Populations are progressively smaller in younger cuts with open canopies and dense growth of competing grasses or herbs. Astragalus paysonii is usually absent or extremely rare at sites that are still being logged (Lorain 1990).

Several populations of Payson's milkvetch have been located on burned sites, suggesting that fire may be important in creating new habitat. A small population was discovered in 1992 in the vicinity of Maki Creek, just 1-2 years after that area was burned. Other populations occur in clear cuts where slash piles have been burned. Shultz and Shultz (1978) have hypothesized that fire may be required for seed germination or to release nutrients needed for seedling survival, but offered no experimental evidence in support. The chief role of fire may be as a disturbance mechanism, comparable to road construction and tree cutting, that creates open habitats suitable for seedling establishment. In the past, fire may have been the major source of disturbance that created new habitat for Astragalus paysonii. Recent fire suppression has been cited as one factor contributing to the rarity of this species (Shultz and Shultz 1978; Lorain 1990).

Populations are occasionally found in small openings in otherwise undisturbed forests of subalpine fir and lodgepole pine. Localized disturbances, such as blow-downs, lightning strikes, or individual tree death, may create these open habitats. Populations at these sites are typically very small and may consist of only a single individual.

The effect of plant succession on Astragalus paysonii habitat was observed at the Waterdog Lake site (Occurrence # 010) in 1992. This population occurs in a semi-shady, grassy meadow with 100% cover. In the absence of disturbance, the vegetation of this site is being replaced by species typical of a mesic-forb community. Although this population is still quite large, many individuals were observed to be in poor condition. This population will probably decline in the future unless new seedling habitat is created by a disturbance. The Waterdog Lake population has been in existence since at least 1979, disputing the claim that this species disappears after about three years following a disturbance (Dorn 1980).

Astragalus paysonii appears to be negatively correlated with A. miser var. hylophilus, another legume adapted to disturbed sites

in the Wyoming/Salt River ranges (Shultz and Shultz 1978). Where the latter is abundant, A. paysonii is either absent or extremely rare (Occurrence #s 007, 016, 017, & 019 in Appendix A). Conversely, many of the larger populations of Payson's milkvetch occur at locations where A. miser is not present (Occurrence #s 002, & 020). Due to its greater seed and fruit production, A. miser var. hylophilus appears to be a more successful competitor, particularly in open canopy sites.

Payson's milkvetch may also be displaced by invading sagebrush-grassland or by weedy grasses and thistles. Populations were notably absent from recovering disturbed sites with abundant Dactylis glomerata, Bromus inermis, Cirsium arvense, and Carduus nutans.

Population Size: Populations of Payson's milkvetch range in size from one to over 3000 individuals. Most populations are extremely small, consisting of an average of 15-20 individuals scattered over an area of less than one acre. Only four populations in Wyoming are known or suspected to contain over 100 individuals. Lorain (1990) has observed similar demographic patterns in Idaho.

Existing and Potential Threats: The primary threat to Payson's milkvetch is plant succession. This species is dependent on disturbances, either natural or man-induced, to create suitable habitat for seedling establishment. In the absence of disturbance events, Astragalus paysonii is displaced by species better adapted to shadier conditions, more developed soils, and higher vegetative cover. Fire suppression may have eliminated an important natural source of disturbance, but this loss has probably been offset by a recent increase in road construction and clear cutting. These land use practices do not appear to conflict with the survival of this species, and may in fact be an important management tool.

Invasion of habitat by weedy species, and the effects of subsequent weed control measures, are a significant potential threat. Weeds such as smooth brome (Bromus inermis), orchard-grass (Dactylis glomerata), musk thistle (Carduus nutans), and Canada thistle (Cirsium arvense) can out-compete Payson's milkvetch in clear cuts and roadsides. Spraying with herbicides, however, could result in increased mortality of Astragalus. Development of biological, or other, alternative, methods of weed control is desirable in known milkvetch habitat.

Summary and Management Recommendations: Although it is now known from 30 sites in the Forest, Payson's milkvetch should remain a BTNF Sensitive species. Only four of the 24 populations surveyed in 1992 contain more than 100 individuals. Most populations are very small, either because they are in decline or are just becoming established in a new area. Trend data are needed to

determine how these populations are responding to different land use activities in the Forest. It is recommended that known populations and potential habitat be resurveyed in 4-5 years to determine whether plants are increasing or decreasing over time in response to various human or natural influences. Ultimately, this information will contribute to more refined management actions that can ensure the long-term survival of this species on BTNF lands.

Astragalus paysonii is currently listed as a Category 3C candidate for Federal listing under the Endangered Species Act (US Fish and Wildlife Service 1990). This category includes species that have been shown to be more widespread than once thought, or which are not subject to any identifiable threats (and so are no longer being considered for listing). In 1991, Payson's milkvetch was recommended for C2 status, a category reserved for species in which there is evidence of vulnerability, but for which additional data are needed (Wyoming Natural Diversity Database 1992). Further changes in the status of Astragalus paysonii should not be made until population trend data can be analyzed to determine if there is a biological need for listing.

TABLE 1.
Location and Demographic Information for Known
Populations of Astragalus paysonii
in Bridger-Teton National Forest, Wyoming

BIG PINEY RANGER DISTRICT

	Location	Pop. Size	Last Obs.
#001	Sublette Co.: Wyoming Range: Darby Creek Basin; adj. to F. S. Rd 10141, ca 1.5 mi E of S. summit of Mt. Darby (T29N R115W S9 SW4 & NW4)	200 (400-500) *	1992 a
#002	Sublette Co.: Wyoming Range: Foothills due N of Edwards Creek, ca 1 mi E of summit of Mt. Schidler (T31N R115W S22, 26)	3000 *	1992 a
#003	Lincoln Co.: Wyoming Range: Middle Fork Creek (T30N R116W S24)	not known	1978
#004	Sublette Co.: Wyoming Range: Horse Creek, 7 mi W of Merna (Type locality) (T34N R114W S4)	not known	1922
#006	Sublette Co.: Wyoming Range: Thompson Pass, ca 1 mi S of summit of Mt. Thompson (T29N R115W S19 SE4)	1	1992 a
#007	Sublette Co.: Wyoming Range: E slope of Darby Mountain, 0.5 mi W of Coal Creek Rd (T29N R115W S4 NW4; T30N R115W S28, 33)	65 *	1992 a
#016	Sublette Co.: Wyoming Range: Prospect Canyon, ca 1.5 mi E of summit of Fish Creek Mountain (T30N R115W S21)	2	1992
#017	Sublette Co.: Wyoming Range: Dutch Dans Gulch Rd, ca 3.5 air mi NE of Middle Piney Lake Campground (T31N R115W S26 SW4)	7	1992
#018	Sublette Co.: Wyoming Range: Irene Creek drainage, ca 1.5 mi NE of summit of Lander Peak (T33N R115W S25 SW4)	20 (50-100) *	1992
#019	Sublette Co.: Wyoming Range: ridge 0.5 mi S of Haki Creek in recent burn site (T33N R114W S8)	2	1992
#024	Sublette Co.: Wyoming Range: South Beaver Creek, ca 3.5 air mi NW of Sherman Guard Station (T35N R114W S15 SE4)	4	1992
#027	Sublette Co.: Wyoming Range: The Rim and area to SW, ca 13 air mi SE of Bondurant (T37N R111W S32)	15	1992
#029	Sublette Co.: Wyoming Range: at the fork of Clark Draw, ca 3 air mi S of Bondurant (T37N R113W S20)	not known	1992

GREYS RIVER RANGER DISTRICT

#008	Lincoln Co.: Wyoming Range: Bailey Creek, 1-1.5 mi S of Bailey Lake, 1.75 mi N of McCain Guard Station (T37N R116W S16, 23 SW4, 26 NE4)	3	1992 a
#009	Lincoln Co.: Salt River Range: ca 0.5 air mi E of Murphy Lakes, ca 0.75 mi N of Star Peaks (T36N R118W S36 SE4; T35N R118W S1 NE4; T35N R117W S6 NW4)	29	1992

#010	Lincoln Co.: Wyoming Range: W side of Waterdog Lake and base of Grayback Ridge, 1 mi N of McCain Guard Station (T37N R116W S36)	130 (600-1000) *	1992	a
#011	Lincoln Co.: Wyoming Range: W and SE shore of Bailey Lake (T37N R116W S14 SW4, S15 SE4, S27)	3	1992	a
#012	Lincoln Co.: Salt River Range: Smith Fork Rd, ca 8.8 air mi S of Smoot (T29N R118W S15)	not known	1986	!
#013	Lincoln Co.: Salt River Range: Bear Creek, ca 1.3 mi W of Greys River (T33N R116W S8)	not known	1982	!
#014	Lincoln Co.: Wyoming Range: Blind Bull Creek drainage, ca 1.75 air mi E of Greys River (T34N R116W S9 SE4)	13 (30-40) *	1992	
#015	Lincoln Co.: Salt River Range: South Three Forks Creek, ca 1.5 air mi W of Greys River (T32N R117W S13 NE4)	36	1992	
#021	Lincoln Co.: Salt River Range: Corral Creek, ca 1 air mi WSW of Corral Creek Guard Station (T31N R116W S17 SW4)	35	1992	
#022	Lincoln Co.: Wyoming Range: Box Canyon, 1.5 air mi S of Corral Creek Guard Station (T31N R116W S21 NE4 of SW4)	4	1992	
#025	Lincoln Co.: Wyoming Range: Deadman Mountain Trail, 1-2 mi from trailhead and adj. to Little Greys River, ca 0.25 mi SE of hunting camp (T36N R116W S28)	15	1992	a
#026	Lincoln Co.: Wyoming Range: Deadman Mountain Trail, ca 1.5-2.5 air mi N of Deadman Mountain summit (T35N R116W S3, 10)	12	1992	
#028	Lincoln Co.: Wyoming Range: Stump Lake, ca 12 air mi SE of Alpine Junction (T36N R117W S32, 33)	not known	1992	
#030	Lincoln Co.: Wyoming Range: Buck Creek-Sheep Creek Ridge, adjacent to Buck Creek logging Rd, 1.9 mi ENE of Greys River (T33N R116W S10 SW4)	not known	1991	

KEMMERER RANGER DISTRICT

#005	Lincoln Co.: Wyoming Range: Clear Creek (T29N 116W S22)	not known	1980	
#020	Lincoln Co.: Twp Range: adjacent to Nugent Park Rd (F. S. Rd 10069), ca 2 air mi S of Kelley Guard Station (T26N R118W S13 SE4 of NE4; T26N R117 1/2W S27 NE4)	39	1992	
#023	Lincoln Co.: Wyoming Range: W end of Absaroka Ridge, ca 1 mi W of Scaler Guard Station (T28N R116W S9 SE4 of SE4)	9	1992	

* estimated population size

! population could not be relocated during 1992 survey

a previously known population relocated during 1992 survey

Based on collections and observations by W. Fertig, O. Harrison, R. L. Hartman, B. E. Nelson, R. Dorn, R. Lichvar, L. & J. Shultz, A. Holmgren, B. Embury, and E. B. Payson.

Figure 2. Line drawing of Astragalus paysonii (from USDA Forest Service 1991)

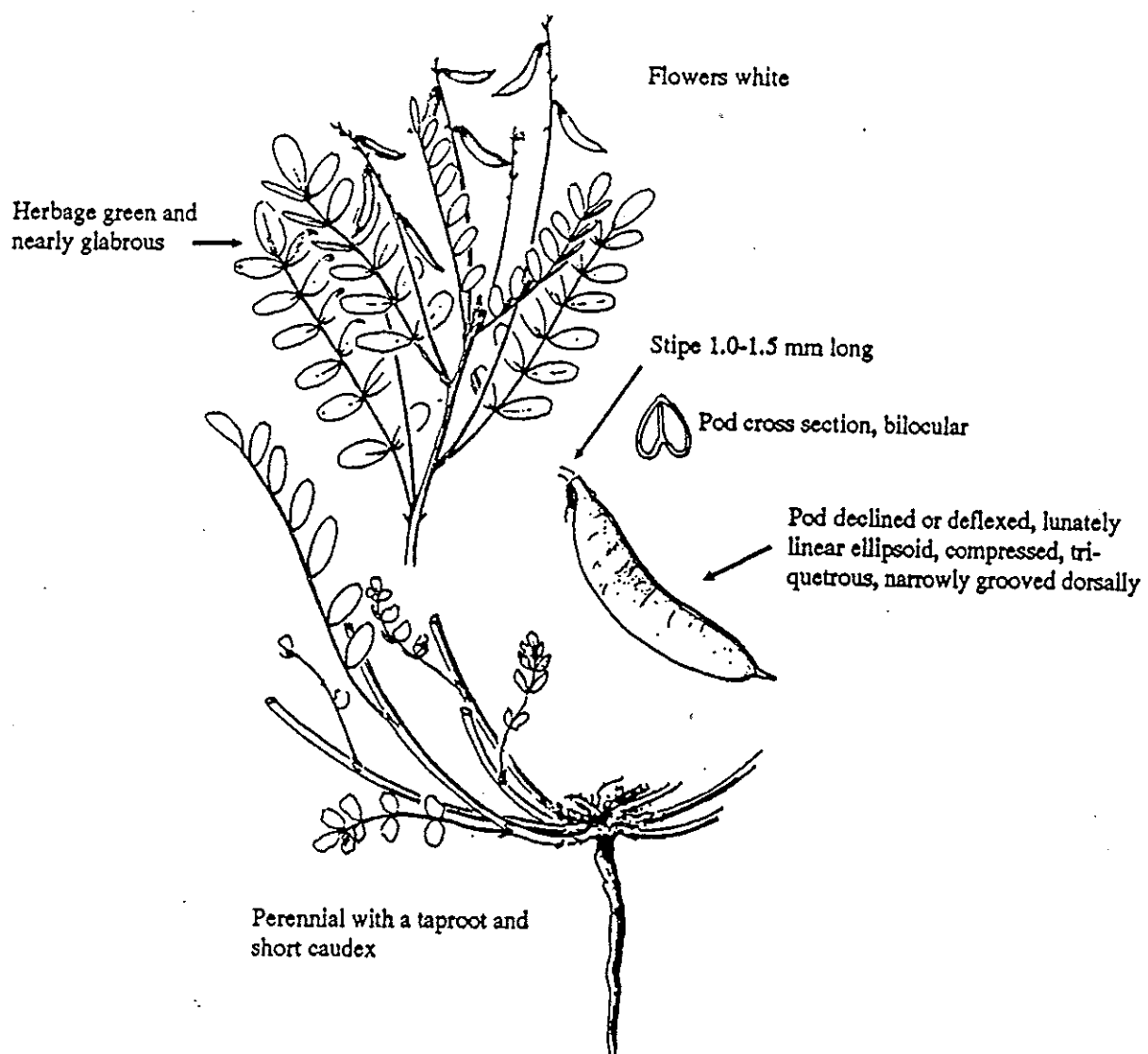


Figure 3. (following page) Close-up of fruit of Astragalus paysonii.



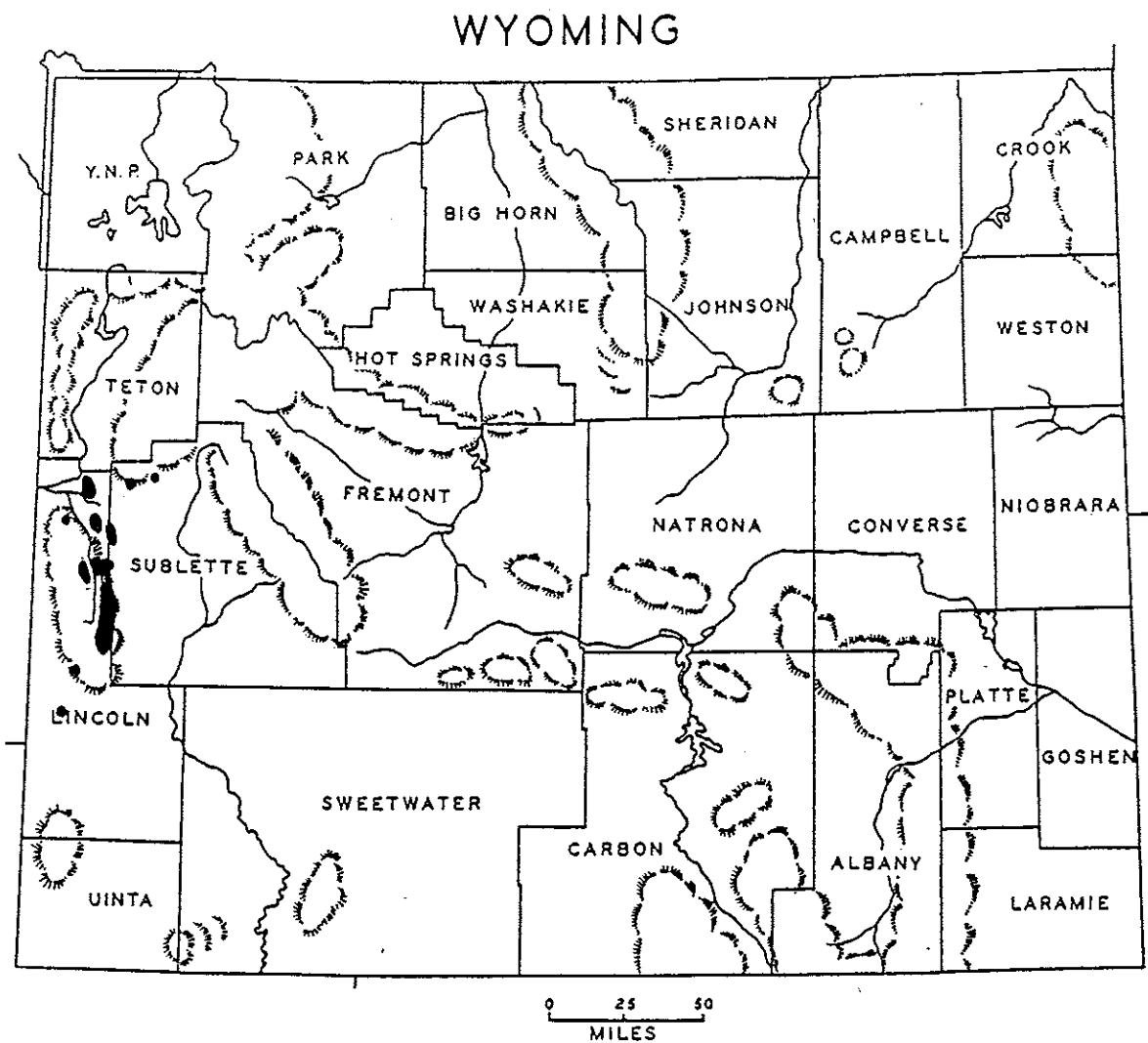


Figure 4. Wyoming distribution map of Astragalus paysonii